

# PATENT COOPERATION TREATY

**PCT**

**NOTIFICATION OF ELECTION**  
(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner  
US Department of Commerce  
United States Patent and Trademark  
Office, PCT  
2011 South Clark Place Room  
CP2/5C24  
Arlington, VA 22202  
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 15 May 2001 (15.05.01)	Applicant's or agent's file reference IPD/P2857/WOD
International application No. PCT/GB00/03249	Priority date (day/month/year) 15 September 1999 (15.09.99)
International filing date (day/month/year) 22 August 2000 (22.08.00)	
Applicant HAILS, Janet, Elizabeth et al	

1. The designated Office is hereby notified of its election made:

in the demand filed with the International Preliminary Examining Authority on:

26 March 2001 (26.03.01)

in a notice effecting later election filed with the International Bureau on:

\_\_\_\_\_

2. The election  was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Pascal Piriou
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

# PCTENT COOPERATION TREA

PCT

## NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

Date of mailing (day/month/year) 26 October 2001 (26.10.01)	From the INTERNATIONAL BUREAU
Applicant's or agent's file reference IPD/P2857/WOD	To:  BOWDERY, A., O. QinetiQ Limited D/IP Formalities A4 Building, Cody Technology Park Ively Road, Farnborough Hampshire GU14 0LX ROYAUME-UNI
International application No. PCT/GB00/03249	IMPORTANT NOTIFICATION
International filing date (day/month/year) 22 August 2000 (22.08.00)	

1. The following indications appeared on record concerning: <input checked="" type="checkbox"/> the applicant <input type="checkbox"/> the inventor <input type="checkbox"/> the agent <input type="checkbox"/> the common representative					
Name and Address THE SECRETARY OF STATE FOR DEFENCE Defence Evaluation Research Agency Ively Road, A4 Building Farnborough Hampshire GU14 0LX United Kingdom		State of Nationality GB		State of Residence GB	
		Telephone No.			
		Facsimile No.			
		Teleprinter No.			
2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning: <input checked="" type="checkbox"/> the person <input type="checkbox"/> the name <input type="checkbox"/> the address <input type="checkbox"/> the nationality <input type="checkbox"/> the residence					
Name and Address QINETIQ LIMITED 85 Buckingham Gate London SW1 6TD United Kingdom		State of Nationality GB		State of Residence GB	
		Telephone No.			
		Facsimile No.			
		Teleprinter No.			
3. Further observations, if necessary: Please note that the agent's address has been changed accordingly.					
4. A copy of this notification has been sent to: <input checked="" type="checkbox"/> the receiving Office <input type="checkbox"/> the designated Offices concerned <input type="checkbox"/> the International Searching Authority <input checked="" type="checkbox"/> the elected Offices concerned <input checked="" type="checkbox"/> the International Preliminary Examining Authority <input type="checkbox"/> other:					
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland  Facsimile No.: (41-22) 740.14.35	Authorized officer  S. Buttay  Telephone No.: (41-22) 338.83.38				

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>IPD/P2857/WOD</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/GB 00/03249</b>	International filing date (day/month/year) <b>22/08/2000</b>	(Earliest) Priority Date (day/month/year) <b>15/09/1999</b>
Applicant <b>THE SECRETARY OF STATE FOR DEFENCE</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 4 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

contained in the international application in written form.

filed together with the international application in computer readable form.

furnished subsequently to this Authority in written form.

furnished subsequently to this Authority in computer readable form.

the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2.  **Certain claims were found unsearchable (See Box I).**

3.  **Unity of invention is lacking (see Box II).**

4. With regard to the **title**,

the text is approved as submitted by the applicant.

the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

the text is approved as submitted by the applicant.

the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

as suggested by the applicant.

because the applicant failed to suggest a figure.

because this figure better characterizes the invention.

1

None of the figures.

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/00/03249

CLASSIFICATION OF SUBJECT MATTER  
 IPC 7 H01L31/18 C30B25/02 C30B29/48

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 H01L C30B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

INSPEC, EPO-Internal, PAJ, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>EP 0 285 834 A (AMERICAN CYANAMID CO)    12 October 1988 (1988-10-12)</p> <p>the whole document</p> <p>---</p> <p>-/-</p>	1-6, 8-10,17, 18

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

## \* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

16 November 2000

Date of mailing of the international search report

04/12/2000

Name and mailing address of the ISA  
 European Patent Office, P.B. 5818 Patentlaan 2  
 NL - 2280 HV Rijswijk  
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.  
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Authorized officer

Visentin, A

## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/GB 00/03249

## (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>DATABASE CHEMICAL ABSTRACTS 'Online!' COLUMBUS, OHIO, US; Abstract No: 112:97989, 9 July 1989 (1989-07-09) GEDRIDGE, ROBERT W. ET AL.: " New organotellurium precursors for the pyrolytic and photolytic deposition of mercury cadmium telluride" XP002153037✓ abstract &amp; MATERIALS RESEARCH SOCIETY SYMPOSIUM PROCEEDINGS, VOL. 131(CHEM. PERSPECT. MICROELECTRON. MATER.), 1989, pages 69-73, ---</p>	1,4
A	<p>J. E. HAILS ET AL.: "Methyl(allyl)telluride as a Te precursor for growth of (Hg,Cd)Te by metalorganic vapour phase epitaxy" JOURNAL OF CRYSTAL GROWTH., vol. 145, no. 1-4, December 1994 (1994-12), pages 596-601, XP002153036✓ NORTH-HOLLAND PUBLISHING CO. AMSTERDAM., NL ISSN: 0022-0248 the whole document</p>	1-7,17
A	<p>EP 0 525 881 A (FMC CORP) 3 February 1993 (1993-02-03) cited in the application the whole document</p>	1,17,18
A	<p>HAILS J E ET AL: "SCREENING OF ORGANOTELLURIUM COMPOUNDS FOR USE AS MOVPE PRECURSORS" JOURNAL OF CRYSTAL GROWTH, NL, NORTH-HOLLAND PUBLISHING CO. AMSTERDAM, vol. 107, no. 1 / 04, 1991, pages 319-324, XP000245842✓ ISSN: 0022-0248 the whole document</p>	1-7,17
A	<p>US 5 124 481 A (HIGA KELVIN T ET AL) 23 June 1992 (1992-06-23) the whole document</p>	1-7,17
A	<p>PATENT ABSTRACTS OF JAPAN vol. 012, no. 072 (E-588), 5 March 1988 (1988-03-05) &amp; JP 62 214626 A (FUJITSU LTD), 21 September 1987 (1987-09-21) abstract</p>	1
		-/-

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/03249

## (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 804 638 A (HOKE WILLIAM E ET AL) 14 February 1989 (1989-02-14) the whole document ---	1-11, 15-17
A	WO 90 15796 A (SECR DEFENCE BRIT) 27 December 1990 (1990-12-27) ---	
A	EP 0 045 258 A (TELECOMMUNICATIONS SA) 3 February 1982 (1982-02-03) ---	
P, X	HAILS J E ET AL: "Allyl-iso-propyltelluride, a new MOVPE precursor for CdTe, HgTe and (Hg,Cd)Te" JOURNAL OF CRYSTAL GROWTH, NORTH-HOLLAND PUBLISHING CO. AMSTERDAM, NL, vol. 214-215, June 2000 (2000-06), pages 45-49, XP004200961 ISSN: 0022-0248 the whole document -----	1-10, 17

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No

PCT/GB 00/03249

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
EP 0285834	A 12-10-1988	DE 3865485 A HK 65992 A IE 61292 B IL 85733 A JP 63283032 A MX 169875 B SG 45392 G		21-11-1991 11-09-1992 19-10-1994 16-02-1992 18-11-1988 29-07-1993 12-06-1992
EP 0525881	A 03-02-1993	US 5211888 A CA 2074613 A,C CA 2074618 A CA 2074618 C DE 69225361 D DE 69225361 T DE 69226005 D DE 69226005 T EP 0525880 A JP 2775239 B JP 8081473 A JP 1962630 C JP 5202066 A JP 6092418 B JP 2551901 B JP 5202074 A US 5340507 A US 5332853 A		18-05-1993 27-01-1993 27-01-1993 31-10-1995 10-06-1998 29-10-1998 30-07-1998 03-12-1998 03-02-1993 16-07-1998 26-03-1996 25-08-1995 10-08-1993 16-11-1994 06-11-1996 10-08-1993 23-08-1994 26-07-1994
US 5124481	A 23-06-1992	US 5043477 A		27-08-1991
JP 62214626	A 21-09-1987	JP 1965837 C JP 6097656 B		25-08-1995 30-11-1994
US 4804638	A 14-02-1989	CA 1319587 A DE 3743132 A FR 2608637 A GB 2199594 A,B JP 63198336 A		29-06-1993 21-07-1988 24-06-1988 13-07-1988 17-08-1988
WO 9015796	A 27-12-1990	DE 69011115 D DE 69011115 T EP 0478590 A ES 2056467 T GB 2249790 A,B JP 2673043 B JP 4506514 T		01-09-1994 24-11-1994 08-04-1992 01-10-1994 20-05-1992 05-11-1997 12-11-1992
EP 0045258	A 03-02-1982	FR 2488048 A DE 3172767 D JP 1707310 C JP 3045331 B JP 57053633 A		05-02-1982 05-12-1985 27-10-1992 10-07-1991 30-03-1982

**PATENT COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**

REC'D 19 FEB 2002

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference  IPD/P2857/WOD	<b>FOR FURTHER ACTION</b>	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No.  PCT/GB00/03249	International filing date (day/month/year)  22/08/2000	Priority date (day/month/year)  15/09/1999
International Patent Classification (IPC) or national classification and IPC  H01L31/18		
<p>IB</p> <p>Applicant  <del>THE SECRETARY OF STATE FOR DEFENCE</del> <i>Qinetiq Limited</i></p>		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li>I <input checked="" type="checkbox"/> Basis of the report</li> <li>II <input type="checkbox"/> Priority</li> <li>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li>IV <input type="checkbox"/> Lack of unity of invention</li> <li>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>VI <input checked="" type="checkbox"/> Certain documents cited</li> <li>VII <input checked="" type="checkbox"/> Certain defects in the international application</li> <li>VIII <input checked="" type="checkbox"/> Certain observations on the international application</li> </ul>		

Date of submission of the demand  26/03/2001	Date of completion of this report  18.02.2002
Name and mailing address of the international preliminary examining authority:   European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized officer  Visentin, A  Telephone No. +31 70 340 2530



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB00/03249

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):  
**Description, pages:**

1-12 as originally filed

**Claims, No.:**

1-18 as originally filed

**Drawings, sheets:**

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description,        pages:
- the claims,        Nos.:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB00/03249

the drawings,      sheets:

5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)): *(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes:      Claims 11-16
	No:      Claims 1-10,17,18
Inventive step (IS)	Yes:      Claims
	No:      Claims 1-18
Industrial applicability (IA)	Yes:      Claims 1-18
	No:      Claims

2. Citations and explanations  
**see separate sheet**

**VI. Certain documents cited**

1. Certain published documents (Rule 70.10)

and / or

2. Non-written disclosures (Rule 70.9)

**see separate sheet**

**VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:  
**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:  
**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB00/03249

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1.) In this report reference is made to the following documents, cited in the International Search Report:

D1: Material Research Society Symposium Proceedings, Vol 131 (Chem. Perspect. Microelectron. Mater.), pages 69-73 (available to this IPEA as Chemical Abstracts Abstract No. 112:97989)

D2: EP-A-285834

D3: US-A-4804638

2.) The subject-matter of claims 1 and 17 does not meet the requirements of Art. 33(2)(3) PCT, because it lacks novelty and consequently also inventive step. Indeed both documents D1 and D2 disclose a method of depositing HgCdTe onto a substrate in a MOVPE technique, using isopropylallyltelluride as organotellurium compound in the presence of a volatile organocadmium compound at a lower film growth temperature (250-350 °C in D2) (see D1, abstract; D2, column 2, line 43-column 4, line 14). Therefore all the features of the method of claim 1 and of the deposited HgCdTe layer are already disclosed, so that the subject-matter of claims 1 and 17 is not new and not inventive.

3.) The subject-matters of the claims 2-10, dependent upon claim 1, are known from document D2 (see D2, column 2, line 43-column 4, line 14). Consequently claims 2-10 cannot add anything new to the subject-matter of claim 1, upon which these claims depend (Art. 33(2)(3) PCT).

4.) The subject-matter of independent claims 11 and 15 does not meet the requirements of Art. 33(3) PCT, because it lacks an inventive step. The method of fabricating an electronic device as claimed in claim 11 as well as the device obtainable by this method (claim 15) is obvious for the skilled man, in view of the

teaching of documents D2 and D3. Once deposited on a substrate a layer of HgCdTe following the method as described in D2, the skilled man knowing that two electrodes are needed in a optoelectronic device (see e.g. D3, column 7, line 33-column 8, line 2; figures 1, 2), is perfectly capable of connecting such electrodes to the deposited layer. No inventive step can be acknowledged to this method step nor to the device obtained using such method.

5.) The subject-matters of claims 12, 13 and 14, dependent upon claim 11, is based on method steps very well known to the skilled man. Consequently these claims cannot add anything inventive to the subject-matter of claim 11, upon which these claims depend (Art. 33(3) PCT).

6.) The subject-matter of independent claims 16 does not meet the requirements of Art. 33(3) PCT, because it lacks an inventive step.

Indeed an array of devices based on HgCdTe constituting an infrared detector is well known to the skilled man (see document D3, column 7, lines 33-53), so that he is capable of obtaining such device, as claimed in claim 16, without any inventive step.

7.) The subject-matter of independent claim 18 does not meet the requirements of Art. 33(2)(3) PCT, because it lacks novelty:

Document D2 describes a method for the preparation of isopropylallyltelluride comprising the steps claimed in claim 18 (see D2, column 3, lines 8-41).

Therefore all the features of the method of claim 18 are already disclosed, so that the subject-matter of claims 18 is not new and not inventive.

8.) All claims 1-18 meet the requirements of Art. 33(4) PCT, because their subject-matters are industrially applicable.

**Re Item VI**

**Certain documents cited**

The document: Journal of Crystal Growth, Vol. 214/215, June 2000, pages 45-49, was published between the priority date and the filing date of the present application.

**Re Item VII**

**Certain defects in the international application**

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D2 is not mentioned in the description, nor is this document identified therein.

The unit of measure Torr, employed on pages 4, 9 and 10 of the description is not additionally expressed in terms of the units stipulated by Rule 10.1/(a) PCT.

**Re Item VIII**

**Certain observations on the international application**

The subject-matters of claims 12,13,15,16 of the application do not meet the requirements of Art. 6 PCT, because they are not clear.

In claims 12 and 13 the specific technical features of the doping step are not given, so that it is not clear how a p-n junction can be formed. These features do not appear to be disclosed in the description of the application.

Claim 15 relates to an undefined device obtainable by the method of claim 1. As claim 1 refers to a method of depositing a layer of HgCdTe onto a substrate, it is not clear which other features such a device should have. The same applies to claim 16, where an infrared detector comprising an array of devices, each one of these not being defined by specific technical features, is claimed.